BROWNWATER BOTTOMLAND HARDWOODS (SWAMP TRANSITION SUBTYPE)

Concept: Brownwater Bottomland Hardwoods communities are forests of Coastal Plain floodplain terraces and ridges other than active natural levees, lacking a significant component of levee tree species, and naturally dominated by bottomland oaks, hickories, and sweetgum. The Swamp Transition Subtype encompasses communities that are transitional to Cypress–Gum Swamp, having a mix of oaks with *Taxodium* or *Nyssa* in the canopy and having lower strata that are similarly intermediate.

Distinguishing Features: Brownwater Bottomland Hardwoods are distinguished by occurrence on floodplains of brownwater rivers but away from the riverbank or natural levees, and by dominance by bottomland oaks or sweetgum. The Swamp Transition Subtype is distinguished from other subtypes by the absence of the less water-tolerant species and by vegetation transitional to Cypress–Gum Swamp. It has significant *Taxodium, Nyssa*, or *Fraxinus*, and the shrub and herb layers are more similar to Cypress–Gum Swamp than to other subtypes of this type. Oaks are less strongly dominant, though *Quercus lyrata* or *Quercus laurifolia* are generally abundant. Though this subtype has a significant component of Cypress–Gum Swamp species, and the abundance of *Fraxinus pennsylvanica* may give it affinities with Levee Forest, it lacks the strong dominance of species typical of those communities.

The Swamp Transition Subtype may resemble the Oak-Gum Slough subtype of Nonriverine Wet Hardwood Forest but occurs on brownwater river floodplains rather than on nonriverine wet flats. The distinction could become difficult on remote high river terraces that no longer flood, but no extant examples of such ambiguous situations are known. The Swamp Transition Subtype may also resemble Tidal Swamp but may be distinguished by a substantial oak component.

Synonyms: *Taxodium distichum - Fraxinus pennsylvanica - Quercus laurifolia / Acer rubrum / Saururus cernuus* Forest (CEGL007719).
Ecological Systems: Atlantic Coastal Plain Small Brownwater River Floodplain Forest (CES203.250). Southern Atlantic Coastal Plain Large River Floodplain Forest (CES203.066).

Sites: Brownwater Bottomland Hardwoods occur in the interior of brownwater river floodplains, away from the natural levees and from the active river channel. The Swamp Transition Subtype may occur on the lowest ridges or alluvial flats, on the edge of higher ridges, or, not infrequently, in sloughs on higher floodplains or terraces. Relict ridges in the tidal reaches of brownwater rivers, but above the level of tidal flooding, may also support this community.

Soils: Soils of the Low Subtype are generally mapped as alluvial soils such as Chewacla (Fluvaquentic Dystrudept), Bibb (Typic Fluvaqent), Chastain, or Wehadkee (Fluvaquentic Endoaquept). They tend to be silty or sandy and high in fertility. Given the heterogeneity of floodplain soils, many of these may be inclusions or may not be typical of the named soil series.

Hydrology: The Swamp Transition Subtype is seasonally flooded. Its flood regime is intermediate between the Low Subtype and Cypress–Gum Swamp, and it may be inundated well into the growing season. When not inundated, the water table may still be high and the soil saturated for

significant periods. Patches in sloughs may carry flowing water with enough current to cause some local scouring.

Vegetation: The Swamp Transition Subtype is a forest dominated by a mix of trees that includes both *Quercus laurifolia, Quercus lyrata*, or *Carya aquatica*, and *Taxodium distichum, Nyssa aquatica*, or *Nyssa biflora*. *Populus heterophylla, Liquidambar styraciflua, Fraxinus pennsylvanica, Fraxinus profunda*, *Acer rubrum* var. *trilobum*, or *Ulmus americana* may also be present in the canopy. Trees of drier bottomland hardwoods, such as *Quercus pagoda* or *Quercus michauxii* are present only in small numbers if at all. The understory may be dominated by *Carpinus caroliniana, Fraxinus caroliniana*, or one of the species in the canopy. Other understory species sometimes present include *Crataegus marshallii* and young individuals of species shared with the levees, such as *Celtis laevigata* or *Platanus occidentalis*. The shrub layer is generally sparse. *Ilex decidua* is most frequent species, but *Itea virginica, Eubotrys racemosa,* or *Cephalanthus occidentalis* may be present. The herb layer is usually patchy, with some dense areas and some areas nearly devoid of cover. *Saururus cernuus* and various species of *Carex* (*louisianica, crinita, lurida, gigantea, lupulina, radiata*, or others) are most often dominant, but *Boehmeria cylindrica, Leersia oryzoides, Persicaria punctata, Persicaria hydropiperoides, Juncus effusus, Justicia ovata, Pilea pumila*, or *Pluchea camphorata* may dominate patches. Other characteristic species include *Lobelia inflata, Mecardonia inflata, Hypericum walteri, Glyceria septentrionalis,* and *Peltandra virginica*. *Tillandsia usneoides* may be abundant on trees.

Range and Abundance: Ranked G3G4. In North Carolina, the Low Subtype occurs along all of the brownwater rivers and may be in any part of the Coastal Plain. This subtype tends to become more prominent in the downstream portions of rivers. However, it may also be abundant in the lowest parts of upstream floodplains that are high enough to have little Cypress–Gum Swamp. The synonymized association is attributed to South Carolina, Mississisippi, and questionably to Louisiana. As with the Low Subtype, this broad range suggests it may be too broadly defined. At the same time, the disjunct distribution suggests that something like it may be going unrecognized in the intermediate states.

Associations and Patterns: The Swamp Transition Subtype occurs in a mosaic with potentially any other brownwater floodplain communities. It often grades to Cypress–Gum Swamp and to the Low or High Subtype, sometimes to Brownwater Levee Forest. Conceptually, this subtype occurs on the slopes of ridges, but often it is not recognizable there unless there is a broad area at the right elevation. In higher floodplains, it may occupy the lowest parts of the mosaic, with Cypress–Gum Swamp absent.

Variation: No variants are recognized at present. This subtype appears to be narrowly defined. However, the distinction between those with *Quercus lyrata* or *Carya aquatica* and those with *Quercus laurifolia* as the only oak warrants investigation.

Dynamics: The dynamics of the Swamp Transition Subtype are similar to most Coastal Plain Floodplain communities and to many other forests. The influx of nutrients brought by flooding likely is a significant influence on them. Flooding is not generally a disturbance, but examples in sloughs that carry current may be subject to local scouring. Because they are low but not as flood-

tolerant as Cypress–Gum Swamps, the Swamp Transition Subtype may potentially be affected by dam-caused alterations that increase the duration of low-level floods.

The Swamp Transition Subtype may be particularly susceptible to impoundment by beaver ponds, converting them into Coastal Plain Semipermanent Impoundment communities. See the discussion under Coastal Plain Semipermanent Impoundment. Because some of the trees in the Swamp Transition Subtype are tolerant of prolonged flooding, they may survive as a partial canopy in beaver ponds. The initial density of *Taxodium* and *Nyssa* may thus determine whether the Coastal Plain Semipermanent Impoundment community is the Cypress–Gum Subtype or the Coastal Plain Marsh Subtype. When a beaver pond is abandoned and drained, it may take some years for the community to return to Bottomland Hardwoods. In addition, deposition of clay in the pond may potentially change the site. The natural abundance of beavers, how long their ponds lasted, and how much of the floodplain their ponds affected under natural conditions is not known. Within large flooplains, sites where dams can impound significant areas and escape destruction by flood flows are probably limited.

Comments: This subtype is compositionally intermediate between Bottomland Hardwoods and Cypress–Gum Swamp. Vegetation structure resembles a Cypress–Gum Swamp, with a low-diversity herb layer containing species such as *Saururus cernuus* or sedges. The boundaries between this community and adjacent ones do not seem to be placed in the same place in different studies, and attribution of CVS plots is somewhat uncertain. Nevertheless, a vegetation group comparable to this is apparent in both Rice et al. (2001) and Faestal (2012).

Rare species:
Vascular plants: *Cardamine douglassii*.

References:
Faestal, M. 2012. Classification and description of alluvial plant communities of the North Carolina Coastal Plain. M.S. thesis, University of North Carolina, Chapel Hill.

Rice, S.K., R.K. Peet, and P. Townsend. 2001. Gradient analysis and classification of the forests of the lower Roanoke River floodplain, North Carolina: a landscape perspective. Unpublished manuscript.